

1 **CLAIMS**

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3 1. A method, comprising:

4 connecting a device to a network service in a plurality of stages;

5 displaying in real-time, a status for each of the plurality of stages; and

6 if the status comprises an error status, further displaying in real-time,

7 troubleshooting help.

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9 2. The method as recited in claim 1, further comprising using a first
10 technique to complete a stage of the plurality of stages and if the first technique
11 fails, then automatically attempting one or more subsequent techniques to
12 complete the stage.

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14 3. The method as recited in claim 1, wherein connecting includes a
15 communicative coupling stage between the device and a network.

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17 4. The method as recited in claim 1, wherein connecting includes a
18 network settings stage for configuring one of a network protocol and a network
19 address.

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21 5. The method as recited in claim 4, wherein the network settings stage
22 exists as an Internet Protocol (IP) settings stage and the network address exists as
23 an IP address.

1 6. The method as recited in claim 5, wherein one or more techniques
2 are attempted for completing the IP settings stage including one of a dynamic host
3 configuration protocol (DHCP) technique, a point-to-point protocol over Ethernet
4 (PPPoE) technique, and a bootstrap protocol (BOOTP) technique.

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6 7. The method as recited in claim 4, wherein connecting includes a
7 name resolution stage for associating the network address to a network domain
8 name.

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10 8. The method as recited in claim 7, wherein the name resolution stage
11 exists as a domain name system (DNS) name resolution stage.

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13 9. The method as recited in claim 1, wherein connecting includes a
14 service connection stage for confirming communication with the network service.

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16 10. The method as recited in claim 1, wherein the connecting proceeds
17 between each of the multiple stages automatically.

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19 11. The method as recited in claim 1, wherein the real-time status
20 includes a message describing one of the plurality of stages.

21

22 12. The method as recited in claim 11, wherein the message describes
23 progress of a technique used to complete one of the plurality of stages.

1 13. The method as recited in claim 1, wherein the real-time status
2 includes a visual indicator of progress of one of the plurality of stages.

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4 14. The method as recited in claim 1, wherein the real-time status
5 includes a visual indicator of success or failure of one of the plurality of stages.

6

7 15. The method as recited in claim 1, wherein the troubleshooting help
8 includes instructions for completing one of the plurality of stages.

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10 16. The method as recited in claim 1, wherein the troubleshooting help
11 includes instructions for completing a technique used to complete one of the
12 plurality of stages.

13

14 17. The method as recited in claim 1, wherein the troubleshooting help
15 includes a serial number of the device.

16

17 18. The method as recited in claim 1, wherein the troubleshooting help
18 includes an error log compiled during the connecting.

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20 19. The method as recited in claim 1, wherein the troubleshooting help
21 includes a stage during the connecting at which a failure occurred.

22

23 20. The method as recited in claim 1, wherein the connecting includes a
24 quality of service testing stage.

1 21. The method as recited in claim 20, wherein the troubleshooting
2 includes quality of service information.

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4 22. The method as recited in claim 21, wherein the quality of service
5 information includes one of an upload bandwidth, a download bandwidth, a
6 network data packet latency, a network data packet drop rate, and a network jitter
7 value.

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9 23. The method as recited in claim 1, wherein the device connects to a
10 network service over the Internet.

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12 24. The method as recited in claim 23, wherein connecting includes a
13 network settings stage for configuring one of a network protocol for the Internet
14 and an Internet Protocol address.

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16 25. The method as recited in claim 24, wherein a dynamic host
17 configuration protocol (DHCP) technique is attempted to complete the network
18 settings stage and if the DHCP technique fails, then a point-to-point protocol over
19 Ethernet (PPPoE) technique is automatically attempted to complete the network
20 settings stage.

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22 26. The method as recited in claim 1, wherein the connecting includes
23 testing whether a communicative coupling exists between the device and the
24 network;

1 displaying a real-time status of the testing, wherein if the communicative
2 coupling exists then displaying a first success indicator and if the communicative
3 coupling does not exist then displaying both a first failure indicator and
4 troubleshooting instructions for establishing the communicative coupling;

5 attempting a network settings detection, wherein if the network settings are
6 successfully detected then displaying a second success indicator and if the
7 communicative coupling does not exist then displaying both a second failure
8 indicator and troubleshooting instructions for detecting the network settings;

9 attempting a domain name system name resolution, wherein if a domain
10 name is successfully resolved then displaying a third success indicator and if the
11 domain name is not resolved then displaying both a third failure indicator and
12 troubleshooting instructions for resolving the domain name; and

13 attempting communication with a network service available on the network,
14 wherein if a communication with the network service is successful then displaying
15 a fourth success indicator and if the communication with the network service is
16 not successful then displaying both a fourth failure indicator and troubleshooting
17 instructions for communicating with the network service.

18
19 27. An engine for connecting a device to a network, comprising:

20 a communicative coupling engine to verify a communicative coupling
21 between a device and a network;

22 a network settings engine to configure network settings, wherein the
23 network settings include a network address;

24 a name resolution engine to associate a computing domain name with the
25 network address; and

1 a service connection engine to communicate with a network service.

2

3 28. The engine as recited in claim 27, further comprising a quality of
4 service module to test and record quality of service parameters in a network.

5

6 29. The engine as recited in claim 27, further comprising a help and
7 troubleshooting engine to instructions in response to a connection failure.

8

9 30. The engine as recited in claim 27, further comprising an error
10 logging engine to record errors during one or more connection attempts.

11

12 31. The engine as recited in claim 30, wherein the error logging engine
13 persists a failure record and related extended error information of a failed
14 connection stage for uploading to a service in response to a subsequent successful
15 connection to a network.

16

17 32. The engine as recited in claim 31, wherein the failure record and
18 related extended error information are uploaded for statistical treatment of
19 multiple connection failures.

20

21 33. The engine as recited in claim 31, wherein the failure record and
22 related extended error information are uploaded for a Bayes network to refine a
23 connection stage between the device and the network.

1 34. The engine as recited in claim 27, further comprising a user-interface
2 engine to generate a user interface for displaying a status of the connecting the
3 device to the network.

4

5 35. The engine as recited in claim 34, wherein the user-interface engine
6 generates a user interface to display one of help and troubleshooting instructions.

7

8 36. The engine as recited in claim 34, wherein the user-interface engine
9 generates a user interface to display quality of service information from a quality
10 of service engine.

11

12 37. The engine as recited in claim 34, wherein the user-interface engine
13 generates a user interface to display error information from an error logging
14 engine.

15

16 38. The engine as recited in claim 27, further comprising a mode
17 selector to switch between automatically connecting the device and the network
18 and manual connecting the device and the network, wherein manual connecting
19 includes manual entry of at least one network setting.

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21 39. One or more computer readable media containing instructions that
22 are executable by a computer to perform connection stages, comprising:
23 verifying a communicative coupling between a device and a network;
24 if the communicative coupling is verified, then obtaining an IP address
25 using the communicative coupling, wherein obtaining an Internet Protocol (IP)

1 address using dynamic host configuration protocol (DHCP) is attempted and if an
2 IP address is not obtained using DHCP then obtaining an IP address using point-
3 to-point protocol over Ethernet (PPPoE) is attempted;

4 if an IP address is obtained, then querying a domain name system (DNS) to
5 resolve a domain name; and

6 if the domain name is resolved, then attempting communication with an
7 online service using the IP address or the domain name.

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9 40. The one or more computer readable media as recited in claim 39,
10 further comprising instructions to test quality of service parameters between the
11 device and the online service.

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13 41. The one or more computer readable media as recited in claim 40,
14 further comprising instructions to indicate in real-time one or more statuses of a
15 connecting process between the device and the network, including a status for
16 each of the verifying a communicative coupling, the obtaining an IP address, the
17 querying a DNS, the attempting communication with an online service, and the
18 testing quality of service parameters.

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20 42. The one or more computer readable media as recited in claim 41,
21 further comprising instructions to display troubleshooting instructions associated
22 with a part of the method whenever the part of the method is not automatically
23 completed.

1 43. The one or more computer readable media as recited in claim 39,
2 further comprising instructions to store a failure record and related extended error
3 information with respect to failures in the connection stages of verifying a
4 communicative coupling, obtaining an IP address, querying a domain name
5 system, and attempting communication with an online service.

6

7 44. The one or more computer readable media as recited in claim 43,
8 further comprising instructions to upload the failure record and related extended
9 error information in response to a subsequent successful connection to a network.

10

11 45. The one or more computer readable media as recited in claim 44,
12 wherein the failure record and related extended error information is used in a
13 Bayes network to improve at least one of the connection stages.

14

15 46. An automated method performed by a network connection-and-
16 troubleshooting engine, comprising:

17 dividing a task of connecting a device to a network or a network service
18 into stages;

19 selecting one of the stages;

20 attempting a technique for completing the selected stage;

21 displaying real-time status reports of the attempting and of a success or a
22 failure of the technique;

23 if the technique is successful, then selecting a subsequent stage and
24 attempting a technique to complete the subsequent stage;

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1 if the technique is not successful, then if more techniques are available then
2 selecting and attempting another technique for the stage; and
3 displaying troubleshooting instructions if the technique is not successful
4 and no more techniques are available.

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6 47. The automated method as recited in claim 46, wherein the device
7 connects to a network service over the Internet.

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9 48. The automated method as recited in claim 46, wherein connecting
10 includes a communicative coupling stage between the device and the network.

11

12 49. The automated method as recited in claim 46, wherein connecting
13 includes a network settings stage for configuring one of a network protocol and a
14 network address.

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16 50. The automated method as recited in claim 49, wherein the network
17 settings stage exists as an Internet Protocol (IP) settings stage and the network
18 address exists as an IP address.

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20 51. The automated method as recited in claim 50, wherein one or more
21 techniques are attempted for completing the IP settings stage including one of a
22 dynamic host configuration protocol (DHCP) technique, a point-to-point protocol
23 over Ethernet (PPPoE) technique, and a bootstrap protocol (BOOTP) technique.

1 52. The automated method as recited in claim 49, wherein connecting
2 includes a name resolution stage for associating the network address to a network
3 domain name.

4

5 53. The automated method as recited in claim 52, wherein the name
6 resolution stage exists as a domain name system (DNS) name resolution stage.

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8 54. The automated method as recited in claim 46, wherein connecting
9 includes a service connection stage for confirming communication with the
10 network service.

11

12 55. The automated method as recited in claim 46, wherein the
13 connecting proceeds between each of the multiple stages automatically.

14

15 56. The automated method as recited in claim 46, wherein the real-time
16 status includes a message describing one of the multiple stages.

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18 57. The automated method as recited in claim 56, wherein the message
19 describes progress of a technique used to complete one of the multiple stages.

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21 58. The automated method as recited in claim 46, wherein the real-time
22 status includes a visual indicator of progress of one of the multiple stages.

23

24 59. The automated method as recited in claim 46, wherein the real-time
25 status includes a visual indicator of success or failure of one of the multiple stages.

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2 60. The automated method as recited in claim 46, wherein the
3 troubleshooting help includes instructions for completing one of the multiple
4 stages.

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6 61. The automated method as recited in claim 46, wherein the
7 troubleshooting help includes instructions for completing a technique used to
8 complete one of the multiple stages.

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10 62. The automated method as recited in claim 46, wherein the
11 troubleshooting help includes a serial number of the device.

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13 63. The automated method as recited in claim 46, wherein the
14 troubleshooting help includes an error log compiled during the connecting.

15
16 64. The automated method as recited in claim 46, wherein the
17 troubleshooting help includes a stage during the connecting at which a failure
18 occurred.

19
20 65. The automated method as recited in claim 46, wherein the
21 connecting includes a quality of service testing stage.

22
23 66. The automated method as recited in claim 65, wherein the
24 troubleshooting includes quality of service information.

1 67. The automated method as recited in claim 66, wherein the quality of
2 service information includes one of an upload bandwidth, a download bandwidth,
3 a network data packet latency, a network data packet drop rate, and a network jitter
4 value.

5
6 68. The automated method as recited in claim 46, wherein for a given
7 stage, if a technique used to complete the stage fails, then a subsequent technique
8 is automatically attempted to complete the stage.

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10 69. The automated method as recited in claim 68, wherein connecting
11 includes a network settings stage for configuring one of a network protocol for the
12 Internet and an Internet Protocol address.

13
14 70. The automated method as recited in claim 69, wherein a dynamic
15 host configuration protocol (DHCP) technique is attempted to complete the
16 network settings stage and if the DHCP technique fails, then a point-to-point
17 protocol over Ethernet (PPPoE) technique is automatically attempted to complete
18 the network settings stage.

19
20 71. In a computer network connection and troubleshooting system
21 having a graphical user interface including a display and a user interface selection
22 device, a method of providing and selecting from a menu on the display
23 comprising the steps of:

24 retrieving a set of menu entries for the menu including a menu having links
25 for selecting between automatically connecting a device to a network and

1 manually connecting the device to the network, wherein the manual connecting
2 includes manual input of at least one network setting;
3 displaying the menu on the display comprising the set of edit menu entries;
4 receiving a menu entry selection signal indicative of the user interface
5 selection device pointing at one of the links on the menu entry on the display, and,
6 in response to the selection signal, selecting either automatic or manual connection
7 of the device to the network.

8

9 72. The method of providing and selecting from a menu as recited in
10 claim 71, further comprising a menu to accept the manual input of the network
11 settings.

12

13 73. The method of providing and selecting from a menu as recited in
14 claim 72, further comprising a menu to display a status of the connecting the
15 device to the network.

16

17 74. The method of providing a selecting from a menu as recited in claim
18 71, further comprising a menu to display troubleshooting instructions in response
19 to a failure to connect the device to the network.

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